Problems with NLDAS forcing ...

cbblanke 38 posts since

Apr 18, 2008

I am using NLDAS forcing and looking at some output. I don't understand everything that is going on.

1. My forcing_variables.txt lists 10 variables, including the snowfall rate. I can't find a routine that reads that file, but all of the f2t routines in the various LSMs seem to have the same list. However, the NLDAS data (stage 1, version 2) I have has a different variable list, 12 variables, not including snowfall. I am not getting any snowfall in my input. Do I have the wrong NLDAS data?

2. When I have my LIS+SHEELS LSM output the forcing data, the shortwave down forcing looks suspicious. In particular, in my domain around the Central US plains, the terminator (day/night boundary) sometimes does not move from 1 hour to the next. I also get a funny case at 15Z on 1/1/2003 where there is a SW-NE line where the terminator shoud be, but with nonzero values on both sides of it. Furthermore, I get different results if I expand my domain and run for a different time period. I also tried directly plotting the shortwave downward forcing from the NLDAS grib files using GrADS, and I can't seem to see any sensible data (I get a terminator in the right place, but there are only 2 values, not a continuous range of values.) All the other fields I plot directly from the GRIB file look reasonable, but I can't make sense of this variable.

You may see some plots of this phenomenon in the attached Powerpoint document.

Can anybody shed some light on this subject?

Thanks,

Clay Blankenship

Attachments:

- SWdown_plots (373.0 K)

Tags: lis, forcing, nldas, shortwave

sujay *118 posts since*
Sep 20, 2007 1. **Re: Problems with NLDAS forcing** Jun 16, 2008 9:04 AM

Clay,

1. Which NLDAS forcing are you using, when you say stage 1, version 2 - the original nldas forcing or the newly processed nldas2 forcing? Where did you download the data?

2. Your description suggests a few things: The native data should work - so if grads is not able to plot it, the data could be corrupted. Again, on which platform are you running this?

Also, there was a similar post earlier, by xingang fan titled - " Initialization or Memory management problem? w.r.t. short wave.... ". You might want to check it out. We implemented a small bug fix on the NLDAS forcing at that time. If you run an 'svn update' you should get those changes. So please make sure your code is upto date.

Also send us your lis.config file.

-S

cbblanke *38 posts since*

Apr 18, 2008 2. **Re: Problems with NLDAS forcing** Jun 16, 2008 4:11 PM

in response to: sujay

1. I believe my NLDAS forcing data are from ftp://hsbserv.gsfc.nasa.gov/NLDAS/LDASFORCING.V2 . As to the version, this is a message I got from Chuck Alonge

"Hi Clay - The forcing data on hsbserv.gsfc.nasa.gov is from NLDAS phase 1. There were two versions of the forcing data for that phase. The first had an error and is no longer available. Version 2 was produced to fix those errors.

Below is a GrADS control file that will help you plot the data.

Hope this helps,

Chuck"

2. Running on discover (linux cluster, using 1 processor).

I did a svn update today and am still getting the problems. I am attaching an updated plot showing the SW forcing from two runs. The only difference in these runs is the number of x points (one is twice as wide in the E-W direction). They disagree at T=14-16, but agree at T=17. Note the color scales on the two plots are not exactly the same, but it is obvious when they disagree.

lis.config also attached.

I will try to replicate the problem with the testcase data, and also with another LSM (any suggestions?).

Clay **Attachments:**

- newSWdown_plots.ppt (279.5 K)
- lis.config.001 (27.1 K)

sujay *118 posts since*
Sep 20, 2007 3. **Re: Problems with NLDAS forcing** Jun 17, 2008 11:56 AM

in response to: cbblanke Clay,

From looking through your lis.config, you seems to be using a customized domain at 12km, in lambert projection, and using USGS veg data. The number of veg types in this data is 24 (not 14). You also seems to have the tiling options turned on. So I am guessing your problems are related to both these specifications.

Please change the number of veg types to 24 and also turn off the tiling option (set Maximum number of tiles per grid to 1) and see if things look better. Once this works, you can turn the tiling back on.

-Sujay

cbblanke *38 posts since*
Apr 18, 2008 4. **Re: Problems with NLDAS forcing** Jun 17, 2008 12:19 PM

in response to: sujay

Oops, I thought I was using the UMD vegtypes. Where can I find a list of what the 24 USGS vegetation types are? We have to add some custom parameters to the vegetation table.

Thanks,

Clay

sujay *118 posts since*
Sep 20, 2007 5. **Re: Problems with NLDAS forcing** Jun 17, 2008 1:46 PM

in response to: cbblanke Clay,

Here is the reference to the USGS data.

Anderson, J.R., Hardy, E.E., Roach J.T., and Witmer R.E. 1976. A Land Use and Land Cover Classification System for Use with Remote Sensor Data. U.S. Geological Survey Professional Paper 964, Reston, VA: U.S. Geological Survey.

A few caveats:

Is there a particular reason why you are using the USGS data? UMD is a much newer dataset compared to the USGS. We have only used the USGS data with Noah LSM and the relevant parameters were provided by the NCAR group. If you use this data with any other LSM, deriving/calibrating the required parameters is your responsibility (For that matter, any landcover dataset).

-S

cbblanke *38 posts since*
Apr 18, 2008 6. **Re: Problems with NLDAS forcing** Jun 17, 2008 2:01 PM

in response to: sujay

I am using the USGS dataset only because Jon Case was running with this setup, and I copied much of his configuration. I had intended to run with UMD vegetation but forgot to change it over. I will try to switch everything over to the UMD data. I know how to generate the 12km data. Can you point me to the original 1km UMD vegetation database? And there is a land mask that goes with that database, is that correct? Do I need to redo my elevation, greenness fraction, soil texture, etc. 12 km data to conform to the UMD landmask?

Clay

cbblanke *38 posts since*
Apr 18, 2008 7. **Re: Problems with NLDAS forcing** Jun 17, 2008 2:03 PM

in response to: sujay

By the way, I turned tiliing off and set the # of veg types to 24. I still see the same strangeness in the SWDown forcing at hour 15-16, where the 2 domains (70x84 and 140x84 lambert conformals) don't agree.

Clay

sujay *118 posts since*
Sep 20, 2007 8. **Re: Problems with NLDAS forcing** Jun 17, 2008 2:03 PM

in response to: cbblanke You can obtain the 1km datasets from the LIS website. You can also see them on discover under

/discover/nobackup/projects/lis/UMD-1KM

You will need to derive all parameter data to be consistent with the specified landmask.

-S

cbblanke *38 posts since*
Apr 18, 2008 9. **Re: Problems with NLDAS forcing** Jun 18, 2008 12:25 PM

I have narrowed down the problem considerably. When I start my LIS-SHEELS run at 0Z on 1/1/2003 I get the same forcing variables as the NLDAS testcase (switching it to the same time period). When I start at 1Z I get dramatically different results for the 15Z shortwave downward forcing (and minor differences for other variables and times). I notice that the testcase for NLDAS started at 23Z so I gather that off-hour starts should not be a problem in general. Oddly enough, I get the exact same forcing fields starting at 0Z or 2Z. Also, the testcase is not affected whether I start at 0Z or 1Z. What could be causing this? The only difference in these two runs is the start hour: 0Z for 09a and 1Z for 08a (contours).

Clay **Attachments:**

- swdown_15z_r09a_r08a.tiff (72.7 K)
- lis.config.08a (22.0 K)
- lis.config.09a (22.0 K)

sujay *118 posts since*
Sep 20, 2007 10. **Re: Problems with NLDAS forcing** Jun 18, 2008 1:17 PM

in response to: cbblanke Clay,

your lis.config files are still incorrect. For example, the number of veg types is still 14.

-S

cbblanke *38 posts since*
Apr 18, 2008 11. **Re: Problems with NLDAS forcing** Jun 18, 2008 2:41 PM

in response to: sujay

Thanks--I had fixed that but reverted to an earlier version.

However when I set it to UMD vegetation with 13 types, I get the same results as above--that is the run starting at 0Z gets different forcing from the run starting at 1Z.

Clay

cbblanke *38 posts since*
Apr 18, 2008 12. **Re: Problems with NLDAS forcing** Jun 18, 2008 2:44 PM

in response to: cbblanke

I seem to be only reading the base forcing (and supplemental forcing) every 2 hours. Should that be happening?

Clay

cbblanke *38 posts since*
Apr 18, 2008 13. **Re: Problems with NLDAS forcing** Jun 18, 2008 5:20 PM

in response to: cbblanke OK, if I set my model timestep to a half-hour, it reads in all the base forcing and I get consistent results with SHEELS and with the testcase. If I set the timestep to 1 hour, it only reads every other base forcing. Is this a property of LIS, or did I mess something up in SHEELS (my LSM)?

geiger *19 posts since*
Sep 20, 2007 14. **Re: Problems with NLDAS forcing** Jun 19, 2008 11:44 AM

in response to: cbblanke Hello,

This is a limitation in LIS. It is best to use the NLDAS forcing data with a sub-hourly time-step.

Jim

sujay *118 posts since*
Sep 20, 2007 15. **Re: Problems with NLDAS forcing** Jun 19, 2008 1:31 PM

in response to: geiger I believe this is a bug. We will work on resolving it.

-S

gdlannoy *4 posts since*
Apr 29, 2008 16. **Re: Problems with NLDAS forcing** Oct 22, 2008 11:45 AM

Dear

I am simply curious about the purpose of the Forcing_variables.txt file and on what it should contain. For example, if you look into the atmdrv of CLM2.0, the names of the different forcing variables are hardwired: so the Forcing_variables.txt-file needs to contain exactly the same names and always 10 variables, no matter which data are used: how/why is user interaction allowed?

I can see that Snowfall rate (which is not provided by the NLDAS ftp://hsbserv.gsfc.nasa.gov/NLDAS/LDASFORCING.V2, i.e. the 10 variable is CAPE) seems not to be read in in the nldas-forcings and hence it does not matter which name is given in the Forcing_variables.txt-file, because for this nldas-type of forcing the 10th variable will not be used. On the other hand, why are there 10 pds-entries provided in the retnldas-procedure, while only 9 are used? There is probably a reason for all this and I would simply like to learn about it...

Many thanks!

Kind regards

Gabriëlle